

CLAIMS

1. A kit for preparing a display, comprising:
a light engine for generating light of a plurality of colors;
5 a substantially flexible conduit for receiving light from the light engine, the conduit constructed of a material suitable to allow viewing of the light generated by the light engine substantially throughout the conduit.

2. A kit of claim 1, wherein the light engine comprises a plurality of light emitting
10 diodes and a controller for controlling the color of light generated by the light emitting diodes.

3. A kit of claim 2, further comprising a fastener for attaching the conduit in a desired configuration.

15 4. A light system, comprising:
a modular conduit for receiving illumination from a light, and
a light engine, wherein the light engine comprises a light source and a controller.

20 5. A system of claim 4 wherein the light is controlled by a controller to produce light of a desired characteristic at each point in time.

6. A system of claim 5, wherein the characteristic is selected from the group consisting of the color, intensity, saturation, and color temperature.

25 7. A system of claim 4, wherein the controller includes an interface.

8. A system of claim 4, wherein the light source comprises an LED.

9. A system of claim 4, wherein the light source comprises a plurality of LEDs of different colors.
10. A system of claim 4, wherein the light source comprises LEDs producing different color temperatures of white light.
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11. A system of claim 4, wherein the light engine operates in white color mode at some times and in a non-white color mode at other times.
- 10 12. A system of claim 4, wherein the light engine produces white light by combining light from LEDs selected from the group consisting of red, green, yellow, blue, amber, white, orange and amber LEDs.
- 15 13. A system of claim 12, wherein the color temperature of white light is adjusted by mixing light from an LED.
14. A system of claim 4, wherein the controller is a processor.
- 15 15. A system of claim 4, wherein the conduit receives light from the light engine.
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16. A system of claim 4, wherein the conduit made of an elastic material suitable for receiving and retransmitting light.
17. A system of claim 4, wherein the conduit is a flexible conduit.
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18. A system of claim 4, wherein the conduit is transparent.
19. A system of claim 4, wherein the conduit is semi-opaque.
- 30 20. A system of claim 4, wherein the conduit is translucent.

21. A system of claim 4, wherein the conduit is reflective.

22. A system of claim 4, wherein the conduit is refractive.

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23. A system of claim 4, wherein the conduit is a transparent elastic material.

24. A system of claim 4, wherein the conduit is elastomeric vinyl acetate.

10 25. A system of claim 4, wherein the conduit is made from a material selected from the group consisting of a polymer, polyurethane, PVC material, rubber, plastic, a metal, and an alloy.

15 26. A system of claim 4, wherein the conduit is made from a hybrid of a plurality of materials.

27. A system of claim 4, wherein the conduit is filled with a fluid.

28. A system of claim 27, wherein the fluid is a gas.

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29. A system of claim 27, wherein the fluid is a liquid.

30. A system of claim 27, wherein the fluid is a vapor.

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31. A system of claim 27, wherein the fluid transmits light.

32. A system of claim 27, wherein the fluid refracts light.

33. A system of claim 27, wherein the fluid contains particles that reflect light.

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34. A system of claim 27, wherein the fluid contains particles that refract light.
35. A lighting system, comprising:
 - a light engine having a control system with a controller and a light source; and
 - an elastomeric conduit for receiving light from the light engine.
36. A system of claim 35, wherein the light source is configured in a linear configuration.
37. A system of claim 35, wherein the light source is configured as an array.
38. A system of claim 35, wherein the light source is configured in a curvilinear configuration.
39. A system of claim 35, wherein the light source is configured with groupings of LEDs.
40. A system of claim 39, wherein each member of the grouping is an LED producing light of a different wavelength.
41. A system of claim 39, wherein the groupings are triads.
42. A system of claim 39, wherein the groupings are quadruplets.
43. A system of claim 39, wherein the groupings are quintuplets.
44. A system of claim 35, wherein the LEDs are configured to fit a lighting fixture.
45. A system of claim 44, wherein the lighting fixture is configured to resemble at least one of an incandescent fixture, a halogen fixture and a fluorescent fixture.

46. A system of claim 35, further comprising an interface for delivering a control signal to the controller.
- 5 47. A system of claim 46, wherein the interface is at least one of a wire, a cable, a network, a bus, a circuit, and a wireless interface.
- 10 48. A system of claim 47, wherein the user interface comprises at least one of a power-cycle-based interface, a general purpose computer interface, a keyboard, a mouse, a voice- or image-recognition interface, a programming interface, a software authoring tool interface, a light show player interface, a touchpad interface, a wireless interface, an interface for a conventional lighting system, an entertainment system interface, a communications system interface, a maintenance system interface, and a navigation system interface.
- 15 49. A system of claim 35, further comprising a surface in proximity to the light engine.
- 20 50. A system of claim 49, wherein the conduit is attached to the surface by an attachment facility.
51. A system of claim 50, wherein the attachment facility is at least one of a fastener, a screw, a clip and a bolt.
- 25 52. A system of claim 50, wherein the attachment facility is a standoff mechanism for holding the conduit a fixed distance from the surface.
53. A system of claim 35, wherein the surface is a surface of a sign.
- 30 54. A system of claim 35, further comprising a mounting facility for the conduit.

55. A system of claim 54, wherein the mounting facility serves as a light shield.

56. A system of claim 54, wherein the mounting facility rests on a light pipe.

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57. A system of claim 56, wherein the light pipe collects light and delivers the light into the conduit.

10 58. A system of claim 35, wherein the light engine is configured to resemble a halogen lamp.

59. A system of claim 58, wherein the light engine is an MR-16 fixture.

15 60. A system of claim 58, wherein the fixture is suitable for insertion into a conventional halogen socket.

61. A system of claim 56, wherein the light pipe guides light into a receiving portion of the conduit, so that the conduit glows with the color of the light from the light engine.

20 62. A system of claim 35, wherein the light engine comprises LEDs selected from red, green, blue, amber, white, orange, and UV LEDs.

63. A system of claim 35, further comprising a control system for the light engine.

25 64. A system of claim 35, wherein the control system includes a user interface.

65. A system of claim 35, wherein the control system includes a data facility.

30 66. A system of claim 35, wherein the control system includes a communication facility.

67. A system of claim 66, wherein the communication facility comprises a network.
68. A system of claim 66, wherein the communication facility comprises a wireless facility.
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69. A system of claim 35, wherein the control system includes an algorithm facility.
70. A system of claim 35, wherein the control system is a general purpose computer.
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71. A system of claim 35, wherein the control system is integrated with other system elements of the environment of the light engine.
72. A system of claim 71, wherein the other system elements are selected from the group consisting of a maintenance system, an entertainment system, a sound system, a navigation system, and a security system.
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73. A system of claim 35, wherein the light engine includes a processor.
74. A system of claim 73, wherein the processor is selected from the group consisting of a microprocessor, a microcontroller, circuit, an application specific integrated circuit, a microchip, a chip residing on a circuit board, a chipset, a circuit board, a programmable digital signal processor, a biological circuit, a programmable gate array, a programmable array logic device, a programmable logic device, a digital signal processor, an analog-to-digital converter, and a digital-to-analog converter, discrete circuitry, passive analog components, active analog components, a resistor, a capacitor, an inductor, a transistor, an operational amplifiers, a discrete digital component, a shift register, and a latch.
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75. A system of claim 35, wherein the system includes a data facility for storing program instructions for the light engine.
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76. A system of claim 75, wherein the data facility comprises at least one of a read-only memory, a programmable read-only memory, an electronically erasable programmable read-only memory, a random access memory, a dynamic random access memory, a double data rate random access memory, a Rambus direct random access memory, and a flash memory.

77. A system of claim 75, wherein the data facility is at least one of a general purpose computer system, a RAM, a ROM, a hard disk memory, a diskette, a zip drive, a jump drive, a database, a SQL database, a TCL database, an Oracle database, an Access database, a data facility of an entertainment system, a data facility of a maintenance system, a data facility of a safety system and a combination of more than one type of data facility.

78. A system of claim 75, wherein the data for the light engine resides in more than one system.

79. A system of claim 78, wherein the first system is a safety system and the second system is an entertainment system.

80. A system of claim 78, wherein the first system is a lighting control system and the second system is an entertainment system.

81. A system of claim 35, further comprising a communication facility, wherein the communications facility comprises at least one of a wire-based facility, a wireless facility, a network, an interface card, a circuit, a router, a switch, a software interface, a wire, a cable, a connector, an RF facility, an IR facility, a serial port, a parallel port, a USB facility, a firewire facility, a copper wire, a modem, a Bluetooth facility, an 802.11 facility, a DSL modems, an antenna, a satellite communications facility, and a telecommunications facility.

82. A system of claim 35, wherein the control system is connected to the lights by a bus that provides two-way communication between the control system and the light engines.

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83. A system of claim 35, wherein the light engines are addressable light engines.

84. A system of claim 35, wherein the conduit comprises sub-elements that can be fitted together to form shapes.

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85. A system of claim 84, wherein the sub-elements are selected from the group consisting of V-shaped elements, L-shaped elements, T-shaped elements, curved elements, and straight elements.

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86. A system of claim 84, wherein the sub-elements are fitted together in combinations.

87. A system of claim 84, wherein the sub-elements are provided in a kit with at least one light engine.

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88. A system of claim 84, wherein the user can shape the sub-elements into a desired shape.

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89. A system of claim 35, wherein the system includes a conduit with a plurality of light engines.

90. A system of claim 89, wherein the light engines are provided with a communications facility.

91. A system of claim 89, wherein the light engines are configured so as to light the conduit in synchronous fashion.

92. A system of claim 89, wherein the light engines change colors in concert.

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93. A system of claim 89, wherein the light engines create a color-chasing rainbow effect.

94. A system of claim 89, wherein the light engines communicate via a flexible facility selected from the group consisting of a flexible wire, a bus, and a cable.

10 95. A system of claim 94, wherein the wire serves as a semi-rigid element for holding the flexible conduit in a selected configuration.

15 96. A system of claim 89, further comprising a semi-rigid element.

97. A system of claim 96, wherein the semi-rigid element is made of a material selected from the group consisting of a metal, a polymer, and a plastic.

20 98. A system of claim 96, wherein the semi-rigid element holds shape when bent.

99. A system of claim 89, wherein at least one light engine has an optical receiver facility for receiving optical data and an optical modulator facility for modulating a portion of the emitted light, so that the light engine communicates to another light engine.

25 100. A system of claim 99, wherein the light engine communicates using transmitted light.

101. A system of claim 99, wherein the light engine communicates using a portion of the electromagnetic spectrum.

102. A system of claim 99, wherein a light engine communicates ongoing data to continually update a second light engine.

103. A system of claim 99, wherein a light engine sends instructions to a second light engine to execute a stored lighting program.

104. A system of claim 103, wherein the instructions relate to clock data, so that various light engines can coordinate with clock time to run stored lighting programs in coordination with each other.

105. A system of claim 35, wherein the conduit is configured to form a sign with lettering.

106. A system of claim 105, wherein light engines are disposed throughout the sign to generate light to illuminate at least portions of the conduit.

107. A system of claim 105, wherein the sign is configured as a logo.

108. A system of claim 105, wherein the sign is configured to resemble a conventional neon sign.

109. A lighting system, comprising:
a first element lit by color-changing illumination from a light engine having a controller and at least one LED; and
a second element lit by color-changing illumination from a light engine having a controller and at least one LED;

wherein the first element is placed in viewing proximity to the second element to produce illumination effects that represent the combination of the two elements.

110. A system of claim 109, wherein the first element is controlled to illuminate in
5 colors that are the same as those of the second element.

111. A system of claim 109, wherein the first element is controlled to illuminate in
colors that are complementary to those of the second element.

10 112. A system of claim 111, wherein the colors of the two elements are generated in
complementary color pairs.

113. A system of claim 112, wherein the color pairs are selected from the group
consisting of a red/green pair, a blue/orange pair, and a yellow/purple pair.

15 114. A system of claim 109, wherein the first element comprises a conduit and a
second element comprises a lit background.

20 115. A system of claim 114, wherein the lit background is edge-lit by a linear array of
light engines.

116. A system of claim 109, wherein the conduit is a sign, and the sign is lit in
coordination with the background.

25 117. A method of providing a kit for preparing a display, comprising:
providing a light engine for generating light of a plurality of colors; and
providing a substantially flexible conduit for receiving light from the light
engine, the conduit constructed of a material suitable to allow viewing of the light
generated by the light engine substantially throughout the conduit.

118. A method of claim 117, wherein the light engine comprises a plurality of light emitting diodes and a controller for controlling the color of light generated by the light emitting diodes.

5 119. A method of claim 118, further comprising a fastener for attaching the conduit in a desired configuration.

10 120. A method of providing a light system, comprising:
providing a modular conduit for receiving illumination from a light, and
providing a light engine, wherein the light engine comprises a light source and a controller.

121. A method of claim 120, wherein the light is controlled by a controller to produce light of a desired characteristic at each point in time.

15 122. A method of claim 121, wherein the characteristic is selected from the group consisting of the color, intensity, saturation, and color temperature.

20 123. A method of claim 120, wherein the controller includes an interface.
124. A method of claim 120, wherein the light source comprises an LED.

25 125. A method of claim 120, wherein the light source comprises a plurality of LEDs of different colors.

126. A method of claim 120, wherein the light source comprises LEDs producing different color temperatures of white light.

30 127. A method of claim 120, wherein the light engine operates in white color mode at some times and in a non-white color mode at other times.

128. A method of claim 120, wherein the light engine produces white light by combining light from LEDs selected from the group consisting of red, green, yellow, blue, amber, white, orange and amber LEDs.

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129. A method of claim 120, wherein the color temperature of white light is adjusted by mixing light from an LED.

130. A method of claim 120, wherein the controller is a processor.

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131. A method of claim 120, wherein the conduit receives light from the light engine.

132. A method of claim 120, wherein the conduit made of an elastic material suitable for receiving and retransmitting light.

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133. A method of claim 120, wherein the conduit is a flexible conduit.

134. A method of claim 120, wherein the conduit is transparent.

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135. A method of claim 120, wherein the conduit is semi-opaque.

136. A method of claim 120, wherein the conduit is translucent.

137. A method of claim 120, wherein the conduit is reflective.

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138. A method of claim 120, wherein the conduit is refractive.

139. A method of claim 120, wherein the conduit is a transparent elastic material.

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140. A method of claim 120, wherein the conduit is elastomeric vinyl acetate.

141. A method of claim 120, wherein the conduit is made from a material selected from the group consisting of a polymer, polyurethane, PVC material, rubber, plastic, a metal, and an alloy.

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142. A method of claim 120, wherein the conduit is made from a hybrid of a plurality of materials.

143. A method of claim 120, wherein the conduit is filled with a fluid.

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144. A method of claim 143, wherein the fluid is a gas.

145. A method of claim 143, wherein the fluid is a liquid.

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146. A method of claim 143, wherein the fluid is a vapor.

147. A method of claim 143, wherein the fluid transmits light.

148. A method of claim 143, wherein the fluid refracts light.

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149. A method of claim 143, wherein the fluid contains particles that reflect light.

150. A method of claim 143, wherein the fluid contains particles that refract light.

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151. A method of providing a lighting system, comprising:
providing a light engine having a controller and a light source; and
providing an elastomeric conduit for receiving light from the light engine.

152. A method of claim 151, wherein the light source is configured in a linear

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configuration.

153. A method of claim 151, wherein the light source is configured as an array.
154. A method of claim 151, wherein the light source is configured in a curvilinear configuration.
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155. A method of claim 151, wherein the light source is configured with groupings of LEDs.
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156. A method of claim 155, wherein each member of the grouping is an LED producing light of a different wavelength.
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157. A method of claim 155, wherein the groupings are triads.
158. A method of claim 155, wherein the groupings are quadruplets.
159. A method of claim 155, wherein the groupings are quintuplets.
160. A method of claim 155, wherein the groupings are sextuplets.
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161. A method of claim 155, wherein the LEDs are configured to fit a lighting fixture.
162. A method of claim 161, wherein the lighting fixture is configured to resemble at least one of an incandescent fixture, a halogen fixture and a fluorescent fixture.
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163. A method of claim 155, further comprising an interface for delivering a control signal to the controller.
164. A method of claim 163, wherein the interface it at least one of a wire, a cable, a network, a bus, a circuit, and a wireless interface.
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165. A method of claim 163, wherein the user interface comprises at least one of a power-cycle-based interface, a general purpose computer interface, a keyboard, a mouse, a voice- or image-recognition interface, a programming interface, a software authoring

5 tool interface, a light show player interface, a touchpad interface, a wireless interface, an interface for a conventional lighting system, an entertainment system interface, a communications system interface, a maintenance system interface, and a navigation system interface.

10 166. A method of claim 155, further comprising a surface in proximity to the light engine.

167. A method of claim 166, wherein the conduit is attached to the surface by an attachment facility.

15 168. A method of claim 167, wherein the attachment facility is at least one of a fastener, a screw, a clip and a bolt.

169. A method of claim 167, wherein the attachment facility is a standoff mechanism
20 for holding the conduit a fixed distance from the surface.

170. A method of claim 166, wherein the surface is a surface of a sign.

171. A method of claim 155, further comprising a mounting facility for the conduit.

25 172. A method of claim 171, wherein the mounting facility serves as a light shield.

173. A method of claim 171, wherein the mounting facility rests on a light pipe.

174. A method of claim 173, wherein the light pipe collects light and delivers the light into the conduit.

175. A method of claim 155, wherein the light engine is configured to resemble a halogen lamp.

176. A method of claim 175, wherein the light engine is an MR-16 fixture.

177. A method of claim 175, wherein the fixture is suitable for insertion into a conventional halogen socket.

178. A method of claim 174, wherein the light pipe guides light into a receiving portion of the conduit, so that the conduit glows with the color of the light from the light engine.

179. A method of claim 155, wherein the light engine comprises LEDs selected from red, green, blue, amber, white, orange, and UV LEDs.

180. A method of claim 155, further comprising a control system for the light engine.

181. A method of claim 180, wherein the control system includes a user interface.

182. A method of claim 180, wherein the control system includes a data facility.

183. A method of claim 180, wherein the control system includes a communication facility.

184. A method of claim 183, wherein the communication facility comprises a network.

185. A method of claim 183, wherein the communication facility comprises a wireless facility.

186. A method of claim 180, wherein the control system includes an algorithm
5 facility.

187. A method of claim 180, wherein the control system is a general purpose computer.

10 188. A method of claim 180, wherein the control system is integrated with other system elements of the environment of the light engine.

15 189. A method of claim 188, wherein the other system elements are selected from the group consisting of a maintenance system, an entertainment system, a sound system, a navigation system, and a security system.

190. A method of claim 155, wherein the light engine includes a processor.

191. A method of claim 190, wherein the processor is selected from the group
20 consisting of a microprocessor, a microcontroller, circuit, an application specific integrated circuit, a microchip, a chip residing on a circuit board, a chipset, a circuit board, a programmable digital signal processor, a biological circuit, a programmable gate array, a programmable array logic device, a programmable logic device, a digital signal processor, an analog-to-digital converter, and a digital-to-analog converter, discrete
25 circuitry, passive analog components, active analog components, a resistor, a capacitor, an inductor, a transistor, an operational amplifiers, a discrete digital component, a shift register, and a latch.

192. A method of claim 180, wherein the control system includes a data facility for
30 storing program instructions for the light engine.

193. A method of claim 192, wherein the data facility comprises at least one of a read-only memory, a programmable read-only memory, an electronically erasable programmable read-only memory, a random access memory, a dynamic random access memory, a double data rate random access memory, a Rambus direct random access memory, and a flash memory.

194. A method of claim 192, wherein the data facility is at least one of a general purpose computer system, a RAM, a ROM, a hard disk memory, a diskette, a zip drive, a jump drive, a database, a SQL database, a TCL database, an Oracle database, an Access database, a data facility of an entertainment system, a data facility of a maintenance system, a data facility of a safety system and a combination of more than one type of data facility.

195. A method of claim 192, wherein the data for the light engine resides in more than one system.

196. A method of claim 195, wherein a first system is a safety system and a second system is an entertainment system.

197. A method of claim 195, wherein a first system is a lighting control system and a second system is an entertainment system.

198. A method of claim 195, wherein the communications facility comprises at least one of a wire-based facility, a wireless facility, a network, an interface card, a circuit, a router, a switch, a software interface, a wire, a cable, a connector, an RF facility, an IR facility, a serial port, a parallel port, a USB facility, a firewire facility, a copper wire, a modem, a Bluetooth facility, an 802.11 facility, a DSL modems, an antenna, a satellite communications facility, and a telecommunications facility.

199. A method of claim 180, wherein the control system is connected to the lights by a bus that provides two-way communication between the control system and the light engines.

5 200. A method of claim 155, wherein the light engines are addressable light engines.

201. A method of claim 155, wherein the conduit comprises sub-elements that can be fitted together to form shapes.

10 202. A method of claim 155, wherein the sub-elements are selected from the group consisting of V-shaped elements, L-shaped elements, T-shaped elements, curved elements, and straight elements.

15 203. A method of claim 155, wherein the sub-elements are fitted together in combinations.

204. A method of claim 155, wherein the sub-elements are provided in a kit with at least one light engine.

205. A method of claim 155, wherein the user can shape the elements into a desired shape.

206. A method of claim 155, wherein the system includes a conduit with a plurality of light engines.

25 207. A method of claim 206, wherein the light engines are provided with a communications facility.

208. A method of claim 206, wherein the light engines are configured so as to light the conduit in synchronous fashion.

209. A method of claim 206, wherein the light engines change colors in concert.
210. A method of claim 206, wherein the light engines create a color-chasing rainbow effect.
211. A method of claim 206, wherein the light engines communicate via a flexible facility selected from the group consisting of a flexible wire, a bus, and a cable.
212. A method of claim 211, wherein a wire serves as a semi-rigid element for holding the flexible conduit in a selected configuration.
213. A method of claim 155, further comprising a semi-rigid element.
214. A method of claim 213, wherein the semi-rigid element is made of a material selected from the group consisting of a metal, a polymer, and a plastic.
215. A method of claim 213, wherein the semi-rigid element holds shape when bent.
216. A method of claim 206, wherein at least one light engine has an optical receiver facility for receiving optical data and an optical modulator facility for modulating a portion of the emitted light, so that the light engine communicates to another light engine.
217. A method of claim 216, wherein the light engine communicates using transmitted light.
218. A method of claim 206, wherein the light engine communicates using a portion of the electromagnetic spectrum.

219. A method of claim 206, wherein a light engine communicates ongoing data to continually update a second light engine.

220. A method of claim 206, wherein a light engine sends instructions to a second

5 light engine to execute a stored lighting program.

221. A method of claim 220, wherein the instructions relate to clock data, so that various light engines can coordinate with clock time to run stored lighting programs in coordination with each other.

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222. A method of claim 155, wherein the conduit is configured to form a sign with lettering.

223. A method of claim 222, wherein light engines are disposed throughout the sign to

15 generate light to illuminate at least portions of the conduit.

224. A method of claim 222, wherein the sign is configured as a logo.

225. A method of claim 222, wherein the sign is configured to resemble a

20 conventional neon sign.

226. A method of providing a lighting system, comprising:

providing a first element lit by color-changing illumination from a light engine having a controller and at least one LED; and

25 providing a second element lit by color-changing illumination from a light engine having a controller and at least one LED.

227. A method of claim 226, wherein the first element is placed in viewing proximity to the second element to produce illumination effects that represent the combination of the two elements.

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228. A method of claim 226, wherein the first element is controlled to illuminate in colors that are the same as those of the second element.

5 229. A method of claim 226, wherein the first element is controlled to illuminate in colors that are complementary to those of the second element.

230. A method of claim 229, wherein the colors of the two elements are generated in complementary color pairs.

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231. A method of claim 230, wherein the color pairs are selected from the group consisting of a red/green pair, a blue/orange pair, and a yellow/purple pair.

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232. A method of claim 226, wherein the first element comprises a conduit and a second element comprises a lit background.

233. A method of claim 232, wherein the lit background is edge-lit by a linear array of light engines.

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234. A method of claim 226, wherein the conduit is a sign, and the sign is lit in coordination with the background.

235. A method of providing a light system, comprising:

providing a substantially linear light engine;

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providing a housing for the light engine;

disposing a substantially cylindrical optical facility on the housing in parallel with a longitudinal axis of the housing; and

illuminating the optical facility by disposing the light engine at an edge of the optical facility.

236. A method of claim 235, wherein the cylindrical optical facility is constructed of a translucent material.

237. A light system, comprising:

- 5 a substantially linear light engine;
- a housing for the light engine; and
- a substantially cylindrical optical facility disposed on the housing in parallel with a longitudinal axis of the housing; wherein the optical facility has a light engine disposed at an edge of the optical facility.

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238. A system of claim 237, wherein the cylindrical optical facility is constructed of a translucent material.